(c) a portable key unit for communicating to said control circuit how to control said locking mechanism according to a fingerprint match determination, wherein said portable key unit comprises: a pressure-based fingerprint sensor for detecting a fingerprint pattern, a semiconductor memory device for storing registered fingerprint data, and a matching unit for determining by electronic processing whether the fingerprint data created from the fingerprint pattern detected by said sensor matches with any of the registered fingerprint data stored in said semiconductor memory device;

28. (new) The lock-controlling system of claim 11 wherein said portable key unit is configured to communicate with said control circuit via (1) at least one electrical connector, (2) wireless communication, (3) magnetic coupling, or (4) electrostatic coupling.

29. (new) The lock controlling system of claim 11 wherein said portable key unit is a card.

Remarks

In response to the §112 and §103 rejections in the present Office Action, Applicant has cancelled claims 1-10 and added new claims 11-29. New independent claim 11 is based on previous claim 1 and previous claim 2 while eliminating the indefiniteness that caused the §112 rejection of claims 1 and 2. Additionally, Applicant submits that the objections to claim informalities stated in the Office Action are no longer applicable because Applicant has removed the language objected to. Also, new claim 19 is based on previous claim 6 and previous claim 7, as is new claim 26.

In response to the portion of the Office Action which rejected previous claim 1 under §112 because the limitations "the object" and "the concerned object" lacked an antecedent basis, Applicant submits that this rejection is not applicable to new claim 11 because claim 11 recites "a locking mechanism for locking movement of an object to be unlocked" and subsequently recites "a mechanism or an electronic circuit for restricting unlocking movement of the object".

Also, in response to the portion of the Office Action which rejected previous claim 2 under §112 because the limitation "the key unit" lacked an antecedent basis, Applicant has included the following in claim 11 "... wherein at least any of said components (b) to (f) is housed in a portable key unit." Support for "a portable key unit" can be found in the description at pages 50-52, Figures 29 and 30, and in the examples explaining many of the figures following Figure 30.

Applicant will now address the patentability of the amended claims with respect to the rejections made in the present Office Action on the basis of the cited references.

I. The combination of Williams (U.S. Patent No. 3,301,961), Gokcebay (U.S. Patent No. 5,337,043), and Tamori (U.S. Patent No. 5,503,029) fails to render claim 11 obvious because the combination of these references fails to teach or suggest a portable key unit that is separated from a locking mechanism, wherein the portable key unit houses "at least one of said components (b) to (f)".

In the present Office Action, claim 1 was rejected as being an obvious combination of the Williams, Gokcebay, and Tamori references. Specifically, the Office Action notes that Williams fails to teach or suggest both (1) the use of electronic memory to store the registered fingerprint data (Williams teaches that fingerprint data should be stored on transparencies that are optically read), and (2) the use of a pressure-based fingerprint sensor (Williams teaches the use of an optical sensor). However, the Office Action contends that the use of a "conventional memory device" to store registered fingerprints is obvious given the teachings of Gokcebay. Further, the Office Action contends that the substitution of a pressure-based fingerprint sensor for the non-pressure-based fingerprint sensors of Gokcebay and Williams is obvious given the teachings of Tamori. Piecing these references together, the Office Action contends that a person of ordinary skill in the art would combine the teachings of Williams, Gokcebay, and Tamori to obviously arrive at Applicant's claimed invention. As to previous claim 2, the Examiner noted that Gokcebay discloses a lock in which the key unit and lock part are separated, and the key unit is portable.

Applicant has now amended the claims such that new claim 11 combines many features of previous claim 1 and previous claim 2. Claim 11 further recites that housed within the portable key unit is at least one of the following components: a mechanism or an electronic circuit for restricting unlocking movement of the object; a pressure based fingerprint sensor for detecting fingerprint pattern; a semiconductor memory device for storing registered fingerprint data; a matching unit for determining by electronic processing whether the fingerprint data created from the fingerprint pattern detected by said fingerprint sensor matches with any of the registered fingerprint data stored in said semiconductor memory device; and a control unit for unlocking the locking mechanism through said restricting mechanism or electronic circuit when there is a match between the detected fingerprint data and the registered fingerprint data. In view of the new limitations recited in claim 11, Applicant submits that the §103 rejections applicable to previous claims 1 and 2 are not applicable to new claim 11. Simply, none of the cited references, when viewed alone or in combination, teach or suggest a locking device having a portable key unit wherein at least one of the above-mentioned components is housed in the portable key unit.

The Tamori reference discloses only a pressure-based fingerprint sensor and does not relate to locking devices. While the Williams reference relates to a locking apparatus, all components of the locking apparatus are housed together; there is no portable key unit. In the Gokcebay device, there is a portable key or card for unlocking the door. However, this key or card does not have at least one of the

recited components (b) to (f) housed therein. Gokcebay merely discloses that the key or card include data stored in an optical format (for keys) or data stored in a magnetic format (for cards). "On a card type key the encoded data can be in a stripe on the card surface. Optical data storage such as used in audio and video discs may be used, or high density optical storage ..." (See Gokcebay, column 2, lines 18-27 (emphasis added)). Figure 6 of Gokcebay discloses a key wherein the identifying data is stored in a recess 20. The data is scanned from this recess by a laser diode 44b. Figure 10 of Gokcebay depicts a card wherein the identifying data is stored in a magnetic stripe 23. Clearly, Gokcebay fails to teach that a semiconductor memory device for storing registered fingerprint data should be housed in the portable key unit, as claimed by Applicant.

Gokcebay provides no motivation to replace the magnetic storage means or the optical storage means with a semiconductor memory device. The semiconductor memory is not an obvious substitution and provides advantages not taught by Gokcebay. Namely, to read the data stored in the semiconductor memory device, the matching unit will not need to include magnetic read heads. Only a simple memory access is needed. To alter the data stored in the semiconductor memory device, a magnetic write head will not be needed; only a simple write access.

Also, unlike optical data storage techniques, such as those used in "audio and video discs", a semiconductor memory device can be easily updated with new registered fingerprints. Optical data storage techniques, such as those used with audio discs and video discs are not readily rewritable. Because of the difficulty and costly processes involved in rewriting to audio/video disc technology, the Gokcebay key has limited value in that it cannot be readily be reissued to authorized personnel. For example, if the Gokcebay key is issued to an employee authorized to enter a particular location in an employer's building, the Gokcebay key will have that employee's fingerprint data optically encoded thereon. In the event that the employee no longer works for the employer, the employee will presumably be requested to return his key. Once the key is returned, it would be beneficial for the employer to reissue that key to a new employee. However, to do so, the employer must be able to encode on the returned key new fingerprint data corresponding to the new employee.

If the key employs the teachings of Gokcebay and uses audio/video disc technology for data storage, such rewriting of fingerprint data will be difficult to implement and expensive. However, if the key in question employs the semiconductor memory device of Applicant's claimed invention, fingerprint data rewriting is easily implemented and the key can be reissued numerous times. Therefore, because the portable key unit of the present invention houses a semiconductor memory device, the present invention provides several functional advantages over that of the prior art., which fails to teach or suggest the use of a semiconductor memory device housed in a key. Namely, magnetic read/write heads are not needed in a matching unit and the fingerprint data can be readily rewritten.

"The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art." In re Lowry, 32 USPQ 2d 1031, 1034 (Fed. Cir. 1994). Because the cited references are silent with respect to housing a semiconductor memory device in a portable key unit, Applicant submits that claim 11 is patentable over the combination of Williams, Gokcebay, and Tamori. Moreover, given the functional advantages that the present invention possesses over the cited references, Applicant submits that the substitution of a semiconductor memory device for a magnetic memory device or an optical memory device is not within the common knowledge of one of ordinary skill in the art. If the Examiner were to take a position that such substitution is within the common knowledge of those of ordinary skill in the art, Applicant respectfully requests the Examiner to cite a reference which suggests housing a semiconductor memory device for storing registered fingerprint data within a portable key unit.

Claims 12-17 recite further limitations on claim 11. These limitations are similarly not taught or suggested by the cited references. Therefore, Applicant submits that claims 12-17 are also allowable.

For the same reasons as expressed above with respect to the locking device of claims 11-17, Applicant submits that claims 19-25 are allowable. Both independent claim 19 and independent claim 25 recite a switching device that is very similar in structure to the locking device of claim 11. The present Office Action rejected previous claims 6-9 (the claims on which new claims 19-25 are based) using the same references discussed above (Williams, Gokcebay, and Tamori). Those references simply do not teach or suggest a portable key unit that houses either a pressure-based fingerprint sensor or a semiconductor memory device (claim 19), or a portable key unit that houses a matching unit (claim 25).

II. Claims 18 and 26 are patentable over the combination of Williams, Gokcebay, and Tamori because that combination fails to teach or suggest the use of a semiconductor memory device for storing registered fingerprint data housed in a locking mechanism.

Claim 18 recites that all of the recited components (b) to (f) (the mechanism or electronic circuit for restricting unlocking movement, the pressure-based fingerprint sensor, the semiconductor memory device, the matching unit, and the control unit) are housed in the locking mechanism. Similarly, claim 26 recites that the pressure-based fingerprint sensor, the semiconductor memory device, the matching unit, and the control unit are housed in the switch. Applicant submits that the § 103 rejection based on the combination of Williams, Gokcebay, and Tamori is inapplicable to claims 18 and 24.

First, the Williams reference fails to teach the use of a semiconductor memory for storing registered fingerprint data. Rather, Williams stores its fingerprint data on optical transparencies. The Office Action contends that it would be obvious to modify the Williams device to include "conventional electronic memory" given the teachings of the Gokcebay reference. However, Gokcebay does not teach

the use of a semiconductor memory device for storing registered fingerprint data that is housed in the locking mechanism. Rather, Gokcebay teaches the use of magnetic memory or optical memory to store registered fingerprint data, wherein the magnetic or optical memory is housed in a key or card. (See Gokcebay, column 2, lines 18-27; Figure 6, Figure 10). Therefore, if one were to combine the Williams device and the Gokcebay device as suggested by the Examiner, the result would be a locking device wherein a magnetic memory device or a optical memory device for storing registered fingerprint data is housed in a key or a card. Applicant, however, claims a locking device wherein a semiconductor memory device for storing fingerprint data is housed in the locking mechanism.

Applicant's semiconductor memory device represents a substantial improvement over that of Gokcebay and Williams. Namely, to read the data stored in the semiconductor memory device, the matching unit will not need to include magnetic read heads. Only a simple memory access is needed. To alter the data stored in the semiconductor memory device, a magnetic write head will not be needed; only a simple write access. Also, unlike optical data storage techniques, such as those used in "audio and video discs", a semiconductor memory device can be easily updated with new registered fingerprints. Furthermore, a fingerprint database can be easily maintained when registered fingerprint data is stored in the locking mechanism itself. That is, to add people to a list of people who are authorized to unlock the object, only a single location will need to have its fingerprint data updated. "The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art." In re Lowry, 32 USPQ 2d 1031, 1034 (Fed. Cir. 1994). Because the combination of Williams, Gokcebay, and Tamori fail to teach or suggest each and every element of Applicant's claim 18 (and claim 26), Applicant submits that the § 103 rejection applicable to former claims 1 and 2 is not applicable to claims 18 or 26.

III. Claims 27-29 are patentable over the combination of Williams, Gokcebay, and Tamori because those references fail to teach or suggest a portable key unit ... comprising a pressure-based fingerprint sensor... , a semiconductor memory ... , and a matching unit.

With respect to claims 27-29, the combination of Williams, Gokcebay, and Tamori fails to teach or suggest a portable key unit for communicating to a control circuit how that control circuit will control a locking mechanism according to a fingerprint match determination, wherein said portable key unit comprises: a pressure-based fingerprint sensor for detecting a fingerprint pattern, a semiconductor memory device for storing registered fingerprint data, and a matching unit for determining by electronic processing whether the fingerprint data created from the fingerprint pattern detected by said sensor matches with any of the registered fingerprint data stored in said semiconductor memory device. Because

the cited references fail to teach such a portable key unit, Applicant submits that the § 103 rejection of claims 1-4 and 6-9 are not applicable to new claims 27-29.

Only Gokcebay discloses a locking device controlled by a key or card. However, the Gokcebay key or card clearly does not comprise the recited components of Applicant's portable key unit. Gokcebay merely teaches that a key or card may comprise data stored in an optical format (with a key; see Figure 6) or data stored in a magnetic format (with a card, see Figure 10). From this teaching, one of ordinary skill in the art would not be motivated to include a pressure-based fingerprint sensor, a semiconductor memory device, and a matching unit in the key or card. No motivation can be found to modify the Gokcebay key to include such components because Gokcebay is addressed to locking and unlocking doors. Doors are large objects that have plenty of space (either in the door itself or in a wall adjacent to the door) to house components such as a fingerprint sensor and a matching unit. Given that the Gokcebay device is not limited in the amount of space available in the door and surrounding area to use for fingerprint processing components, Gokcebay is utterly unconcerned with reducing the size of the locking device near the object to be locked. Therefore, no motivation can be found to reduce the size of the locking device near the object to be locked. Moreover, *no teaching or suggestion can be found to reduce the size of the locking device near the door or adjacent wall by moving the fingerprint sensor, the semiconductor memory, and matching unit to a portable key unit.*

As is well-settled, "[i]t is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art." Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 USPQ 416, 419 (Fed. Cir. 1986). "When prior art references require selective combination ... to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." Uniroyal Inc. v. Rudkin-Wiley Corp., 5 USPQ 2d 1434, 1438 (Fed. Cir. 1988). Because of the silence found in the cited references with respect to housing the fingerprint sensor, semiconductor memory device, and matching unit in a portable key unit, Applicant submits that new claims 27-29 are patentable over the combination of Williams, Gokcebay, and Tamori.

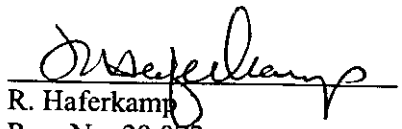
IV. The rejection of previous claims 5 and 10 under § 103 based on the combination of Williams, Gokcebay, Tamori, and Cockburn (U.S. Patent No. 5,055,658) is not applicable to new claims 16, 23, or 28.

The present Office Action rejected previous claims 5 and 10 citing the Cockburn reference in combination with the Williams, Gokcebay, and Tamori references. The limitations found in previous claims 5 and 10 are now found in claims 16, 23, and 28. However, because claims 16, 23, and 28 depend from allowable claims, Applicant submits that claims 16, 23, and 28 are likewise allowable.

Conclusion

For the foregoing reasons, Applicant submits that the claims as amended are allowable, and respectfully requests favorable action. The Examiner is invited to contact the undersigned attorney to discuss the application if the Examiner believes that it will advance the prosecution of the case.

Respectfully submitted,



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